

PAT-NO: JP411238305A  
DOCUMENT- JP 11238305 A  
IDENTIFIER:  
TITLE: DATA PROCESSING METHOD AND DATA  
RECORDING AND REPRODUCING DEVICE

PUBN-DATE: August 31, 1999

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APPL-NO: JP10040730  
APPL-DATE: February 23, 1998

INT-CL (IPC): G11B020/10

ABSTRACT:

PROBLEM TO BE SOLVED: To effectively prevent an illegal copy with an inexpensive and simple constitution by using plural modulation systems,

generating a code word as to a specific sector with a modulation system different from that of other sectors and writing data for decoding the data of the other sectors normally in the specific sector.

SOLUTION: Encryption data of a key generating circuit 21 are supplied to an encoder buffer 203 together with video data from a video encoder 202 and they are multiplexed in time-division manner in a multiplexer 204 to be outputted. After the encryption data are added with an error correction code by an ECC encoder 205, the data are transmitted to a switch 210 to be written in the specific sector on an optical disk 208. The bit stream of the encryption data is modulated by a submodulation circuit 209 whose system is a modulation system entirely different from that of a main modulation circuit 206 by being changed over with a switch 210. Thus, the encryption data fail to function normally in a normal reproducing device and the reproducing of the data becomes impossible and the illegal copy is prevented.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] In case this invention enciphers data and records them on record media, such as a disk, it relates to the suitable data-processing approach and a data-logging regenerative apparatus.

[0002]

[Description of the Prior Art] The confidentiality of data is secured or, generally enciphering data conventionally for unlawful access to data, prevention of a copy, etc. is performed.

[0003] As the technique of the above-mentioned data encryption, the code approach represented by the so-called DES (Data Encryption Standard) etc. is learned, for example.

[0004]

[Problem(s) to be Solved by the Invention] However, it was restricted to operation by the system that it is difficult for this code approach to carry out on a scale of being small from the difficulty [ a key (encryption key) ] of management, its amount of operations, etc., and advanced.

[0005] Moreover, the illegal copy poses a problem in recent years, and the protection of copyrights of the work distributed especially with the gestalt of digital data is needed. If large capacity-ization of recordable disks, such as a magneto-optic disk and an optical phase change disk, progresses especially, manufacture of a lot of duplicate objects is attained on home level, and it has been a technical problem to prevent this.

[0006] Then, it aims at proposing the data-processing approach and data-logging regenerative apparatus which this invention is proposed in view of the above-mentioned actual condition, and management of an encryption key is easy for it, and the amount of operations also has it, and can realize it also by the easy system, therefore enable encryption which can prevent an illegal copy effectively even if it is a cheap and easy configuration. [ little ]

[0007]

[Means for Solving the Problem] The data-processing approach of this invention solves the technical problem mentioned above by using at least two modulation techniques, generating a codeword by modulation technique which is different from other sectors about a specific sector, and writing the data for decoding the data of other sectors normally in a specific sector.

[0008] Moreover, a means to generate a codeword by modulation technique which at least two modulation techniques are used for the data-logging regenerative apparatus of this invention, and is different from other sectors about a specific sector, The means which writes the data for decoding the data of other sectors normally in a specific sector, A means to record those modulating signals on a record medium, and a means to restore to the data of a specific sector by one of at least two recovery methods, The technical problem mentioned above is solved by having the means which enables normal playback of the recovery data of other sectors based on the data to which the specific sector restored.

[0009]

[Embodiment of the Invention] The gestalt of 1 operation of the data-processing approach concerning this invention and a data-logging regenerative apparatus is explained referring to a drawing.

[0010] The example of a configuration of the recording system (encoding system) in the system of the gestalt of 1 operation by which the data-processing approach concerning this invention and a data-logging regenerative apparatus are applied to drawing 1 is shown. With the configuration of this drawing 1, compression coding of the dynamic-image signal which consists of two or more images (it is hereafter called a picture) as an example of a digital signal is carried out, and the example which records this dynamic-image signal that carried out compression coding on the optical disk as an example of a record medium is given. ✓

[0011] In drawing 1, the dynamic-image signal S31 which consists of two or more above-mentioned pictures is inputted into the terminal 200. The video encoder 202 encodes the inputted picture signal of a current picture so that it may become the amount of target coding bits. The coding bit stream S32 obtained by compression coding with the above-mentioned video encoder 202 is inputted into a transmission buffer (it is hereafter called the encoder buffer 203).

[0012] This encoder buffer 203 graduates fluctuation of the amount of generating signs for every input picture, and since a bit stream is outputted with a predetermined bit rate, there is. The bit stream S33 read from this encoder buffer 203 is inputted into the multiplexing machine (multiplexer) 204.

[0013] In addition, although drawing 1 does not show, the coding bit stream which carried out compression coding of the audio signal is inputted into this multiplexing machine 204, and the multiplexing machine 204 multiplexes the input bit stream of these plurality by time sharing, and makes it one bit stream.

[0014] By the ECC encoder 205, an error condition is added and the bit stream outputted from this multiplexing machine 204 is sent to the main modulation circuit 206 through a switch 210.

[0015] In this main modulation circuit 206, predetermined modulation processing, for example, the modulation of EFM+ currently used for the so-called DVD (a digital video disc or digital versatile disk) etc., is processed to the output bit stream of the ECC encoder 205 supplied through the switch 210. The output data of this main modulation circuit 206 are sent to a recording head 207, and a signal S34 is recorded on an optical disk 208 by this recording head 207.

[0016] Furthermore, in the system of the gestalt of this operation, encryption data (an encryption key, encryption Ruhr) are generated from the key generating circuit 201, and the scramble of the above-mentioned coding bit stream S32 is performed by controlling the read-out address of the above-mentioned encoder buffer 203 based on this encryption data. That is, from the encoder buffer 203 concerned, the bit stream S33 by which the above-mentioned coding bit stream S32 was scrambled based on the above-mentioned encryption data is outputted. Therefore, the above-mentioned bit stream recorded on the optical disk 208 as the above-mentioned signal S34 will consist of data by which the scramble based on the above-mentioned encryption data was performed.

[0017] Moreover, the information on the encryption data (encryption Ruhr) of the key generating circuit 201 is supplied to the above-mentioned encoder buffer 203 as data with the video data (and audio data) from the above-mentioned video encoder 202. The encryption data furthermore supplied to this encoder buffer 203 are sent to a switch 210, after being sent to the above-mentioned multiplexing machine 204 and adding an error condition by the ECC encoder 205. Finally the encryption data concerned will be written in the predetermined field on an optical disk 208 (sector). ✓ \* \*

[0018] When it is made to write it in a predetermined sector as a bit stream as usual, namely, when it becomes irregular like the case of the bit stream of an audio and a video decoder (AV data) in the main modulation circuit 206 and is made to write in a predetermined sector about this encryption data here, it is got over and analyzed easily and the encryption data concerned are in the end. And the bit stream can also be decoded easily.

[0019] So, with the gestalt of this operation, it is made to become irregular by the modulation technique using the algorithm which changes a switch 210 and completely changes in the above-mentioned main modulation circuit 206 with delivery and submodulation circuits 209 concerned in the submodulation circuit 209 about the bit stream of this encryption data. That is, when the main modulation circuit 206 is the modulation of EFM+ of 8 -16 modulation, in the above-mentioned submodulation circuit 209, modulation techniques, such as EFM which is 8 -17 modulation currently used, for example for the so-

called CD (compact disk), are used.

[0020] By this, the code train by which code conversion was carried out by different modulation technique the sector of the same size and in an error correction block will exist on an optical disk 208. Moreover, by the bit stream of AV data, and the bit stream of encryption data, when the breaks of WORD will also differ mutually, therefore it is going to reproduce encryption data with the usual regenerative apparatus, the effectiveness of making the regenerative apparatus malfunctioning will be acquired.

[0021] In addition, it shall not open to the public about the modulation technique of this submodulation circuit 209.

[0022] Next, the configuration of the reversion system (decoding system) in the gestalt system of this operation is explained using drawing 2. With the gestalt of this operation, at least two demodulator circuits corresponding to the main modulation circuit 206 and the submodulation circuit 209 of a recording system exist also about a reversion system, respectively.

[0023] In drawing 2, data are read from an optical disk 208 by the reproducing head 301 by the reversion system.

[0024] Here, if read-out is started based on a sector address, the predetermined sector on an optical disk 208 will be read first, and the bit stream of encryption data will be obtained. As for the bit stream of this encryption data, the recovery of 1-7RLL is made by the subdemodulator circuit 308.

[0025] As for the encryption data concerned to which it restored, an error correction is made by the ECC decoder 303, and the data with which this error correction was made are divided into various data and other data by the demultiplexer 304 after that.

[0026] The encryption data separated by the demultiplexer 304 are sent to the key discharge circuit 307 through a buffer 305, and are registered here. The encryption data registered into the key discharge circuit 307 concerned are used for descrambling of other data as an encryption key.

[0027] Next, as for the bit stream read from the sector of the usual AV data, the recovery of for example, EFM+ is made by the main demodulator circuit 302.

[0028] As for the bit stream of the AV data concerned to which it restored, an error correction is made by the ECC decoder 303, and the data with which this error correction was made are divided into various data and other data by the demultiplexer 304 after that. That is, the video data and audio data which are multiplexed are separated in the demultiplexer 304 at this time. The video data by which separation was carried out [ above-mentioned ] is sent to a buffer 305, and the audio data similarly separated are sent to the audio signal processor which omitted illustration.

[0029] The data sent to the above-mentioned buffer 305 are data with which the scramble based on encryption data is made in said recording system, and descrambling of the data concerned currently scrambled is performed by reading based on the encryption data registered into the key discharge circuit 307, and controlling the address by this buffer 305.

[0030] It is sent to the video decoder 306, compression is solved by the video decoder 306 concerned, and the data (video data compressed) by which descrambling was carried out [ above-mentioned ] from the above-mentioned buffer 305 are outputted as a video signal.

[0031] Here, the reason for the ability to prevent a duplicate with unjust this invention is explained.

[0032] Since only one modulation technique is specified and conventionally maintains compatibility as a modulation technique to a multiplexing bit stream, it is completely opened to the public by the modulation technique. For example, 16-bit modulation WORD [ as opposed to 8-bit input WORD in the modulation table EFM+ adopted as the above-mentioned DVD ] is defined. As for this modulation table, in consideration of the number which "1" and "0" follow, or the value (DSV) of Accumulation DC, the optimal combination is selected from the 16-bit WORD which can be taken. Therefore, as long as transposition is taken by this modulation technique, even if the bit stream on an optical disk is a code, it can be read as a certain code (character code). For this reason, if the code concerned is analyzed, the principle nature of a code will be able to be found out, consequently an unjust copy will be attained.

[0033] On the other hand, as shown in this invention, when only a certain sector was modulated by another modulation technique (for example, EFM) and it gets over in the demodulator circuit (the main

demodulator circuit 302) of EFM+ as a codeword according the bit stream to the modulation technique of the main modulation circuit 206, the WORD which EFM+ does not define may be contained and a normal recovery becomes impossible. Moreover, in EFM+ and EFM, since codeword length differs by 16 bits and 17 bits, even separation of a codeword cannot be performed.

[0034] Therefore, the latter ECC decoder 303 tends to detect and tends to perform the error correction by ECC as if the sector concerned had an error. However, since there is no normal parity for correcting also about ECC, it will malfunction as a burst error. Therefore, the character string (namely, encryption data) itself currently written to the sector concerned is undetectable.

[0035] In addition, since it is time amount with short 1 sector extent as a modulation technique (submodulation technique) in the submodulation circuit 209, DSV does not pose a problem but can use any modulation techniques. Moreover, in the modulation technique existing [ many ], even if it is the same modulation technique, a codeword will occur like the modulation technique of a different thing by changing the regularity of a correspondence codeword. Therefore, it is difficult to try exchange of all the modulation technique and its codeword, and even if it has the usual technique, it is difficult [ it ] to specify a submodulation technique.

[0036] Moreover, the main modulation circuit and the submodulation circuit concerning the gestalt of this invention operation, the main demodulator circuit, and a subdemodulator circuit are other circumference circuits and really (formation of 1 chip) carried out, and it also becomes possible by enabling it not to operate independently only a submodulation circuit and a subdemodulator circuit to prevent the so-called reverse engineering.

[0037]

[Effect of the Invention] By generating a codeword in the data-processing approach of this invention by modulation technique which is different from other sectors about a specific sector, and writing the data for decoding the data of other sectors normally in a specific sector Moreover, it sets to the data-logging regenerative apparatus of this invention. A means to record those modulating signals on a record medium, and a means to restore to the data of a specific sector by one of at least two recovery methods, By having the means which enables normal playback of the recovery data of other sectors based on the data to which the specific sector restored Management of an encryption key is easy, and there are also few amounts of operations, an easy system can also realize, therefore even if it is a cheap and easy configuration, the encryption which can prevent an illegal copy effectively is attained.

[0038] That is, unless according to this invention it writes generating a codeword by at least two modulation techniques by modulation technique which is different from other sectors about a specific sector and neither of the modulation techniques is specified, it cannot restore to the codeword of a specific sector. Therefore, unless it can restore to the key information on the playback authorization written in this specific sector, the normal playback which are other sectors can also be prevented from the ability doing.

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[Translation done.]

JAPANESE

[JP,11-238305,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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CLAIMS

[Claim(s)]

[Claim 1] The data-processing approach which uses at least two modulation techniques, generates a codeword by modulation technique which is different from other sectors about a specific sector, and is characterized by writing in the data for decoding the data of other sectors normally into the above-mentioned specific sector.

[Claim 2] Into a codeword generation means to generate a codeword by modulation technique which uses at least two modulation techniques and is different from other sectors about a specific sector, and the above-mentioned specific sector The write-in means which writes in the data for decoding the data of other sectors normally, A record means to record the modulating signal by the above-mentioned modulation technique on a record medium, and a recovery means to restore to the data of the above-mentioned specific sector with the recovery method of one of at least two recovery methods, The data-logging regenerative apparatus characterized by having the playback means which enables normal playback of the recovery data of a sector besides the above based on the data to which the above-mentioned specific sector restored.

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JAPANESE

[JP,11-238305,A]

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**TECHNICAL FIELD**

[Field of the Invention] In case this invention enciphers data and records them on record media, such as a disk, it relates to the suitable data-processing approach and a data-logging regenerative apparatus.

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**PRIOR ART**

[Description of the Prior Art] The confidentiality of data is secured or, generally enciphering data conventionally for unlawful access to data, prevention of a copy, etc. is performed.

[0003] As the technique of the above-mentioned data encryption, the code approach represented by the so-called DES (Data Encryption Standard) etc. is learned, for example.

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**EFFECT OF THE INVENTION**

[Effect of the Invention] By generating a codeword in the data-processing approach of this invention by modulation technique which is different from other sectors about a specific sector, and writing the data for decoding the data of other sectors normally in a specific sector Moreover, it sets to the data-logging regenerative apparatus of this invention. A means to record those modulating signals on a record medium, and a means to restore to the data of a specific sector by one of at least two recovery methods, By having the means which enables normal playback of the recovery data of other sectors based on the data to which the specific sector restored Management of an encryption key is easy, and there are also few amounts of operations, an easy system can also realize, therefore even if it is a cheap and easy configuration, the encryption which can prevent an illegal copy effectively is attained.

[0038] That is, unless according to this invention it writes generating a codeword by at least two modulation techniques by modulation technique which is different from other sectors about a specific sector and neither of the modulation techniques is specified, it cannot restore to the codeword of a specific sector. Therefore, unless it can restore to the key information on the playback authorization written in this specific sector, the normal playback which are other sectors can also be prevented from the ability doing.

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JAPANESE [JP,11-238305,A]

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**TECHNICAL PROBLEM**

[Problem(s) to be Solved by the Invention] However, it was restricted to operation by the system that it is difficult for this code approach to carry out on a scale of being small from the difficulty [ a key (encryption key) ] of management, its amount of operations, etc., and advanced.

[0005] Moreover, the illegal copy poses a problem in recent years, and the protection of copyrights of the work distributed especially with the gestalt of digital data is needed. If large capacity-ization of recordable disks, such as a magneto-optic disk and an optical phase change disk, progresses especially, manufacture of a lot of duplicate objects is attained on home level, and it has been a technical problem to prevent this.

[0006] Then, it aims at proposing the data-processing approach and data-logging regenerative apparatus which this invention is proposed in view of the above-mentioned actual condition, and management of an encryption key is easy for it, and the amount of operations also has it, and can realize it also by the easy system, therefore enable encryption which can prevent an illegal copy effectively even if it is a cheap and easy configuration. [ little ]

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MEANS

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[Means for Solving the Problem] The data-processing approach of this invention solves the technical problem mentioned above by using at least two modulation techniques, generating a codeword by modulation technique which is different from other sectors about a specific sector, and writing the data for decoding the data of other sectors normally in a specific sector.

[0008] Moreover, a means to generate a codeword by modulation technique which at least two modulation techniques are used for the data-logging regenerative apparatus of this invention, and is different from other sectors about a specific sector, The means which writes the data for decoding the data of other sectors normally in a specific sector, A means to record those modulating signals on a record medium, and a means to restore to the data of a specific sector by one of at least two recovery methods, The technical problem mentioned above is solved by having the means which enables normal playback of the recovery data of other sectors based on the data to which the specific sector restored.

[0009]

[Embodiment of the Invention] The gestalt of 1 operation of the data-processing approach concerning this invention and a data-logging regenerative apparatus is explained referring to a drawing.

[0010] The example of a configuration of the recording system (encoding system) in the system of the gestalt of 1 operation by which the data-processing approach concerning this invention and a data-logging regenerative apparatus are applied to drawing 1 is shown. With the configuration of this drawing 1, compression coding of the dynamic-image signal which consists of two or more images (it is hereafter called a picture) as an example of a digital signal is carried out, and the example which records this dynamic-image signal that carried out compression coding on the optical disk as an example of a record medium is given.

[0011] In drawing 1, the dynamic-image signal S31 which consists of two or more above-mentioned pictures is inputted into the terminal 200. The video encoder 202 encodes the inputted picture signal of a current picture so that it may become the amount of target coding bits. The coding bit stream S32 obtained by compression coding with the above-mentioned video encoder 202 is inputted into a transmission buffer (it is hereafter called the encoder buffer 203).

[0012] This encoder buffer 203 graduates fluctuation of the amount of generating signs for every input picture, and since a bit stream is outputted with a predetermined bit rate, there is. The bit stream S33 read from this encoder buffer 203 is inputted into the multiplexing machine (multiplexer) 204.

[0013] In addition, although drawing 1 does not show, the coding bit stream which carried out compression coding of the audio signal is inputted into this multiplexing machine 204, and the multiplexing machine 204 multiplexes the input bit stream of these plurality by time sharing, and makes it one bit stream.

[0014] By the ECC encoder 205, an error condition is added and the bit stream outputted from this multiplexing machine 204 is sent to the main modulation circuit 206 through a switch 210.

[0015] In this main modulation circuit 206, predetermined modulation processing, for example, the modulation of EFM+ currently used for the so-called DVD (a digital video disc or digital versatile disk) etc., is processed to the output bit stream of the ECC encoder 205 supplied through the switch 210. The

output data of this main modulation circuit 206 are sent to a recording head 207, and a signal S34 is recorded on an optical disk 208 by this recording head 207.

[0016] Furthermore, in the system of the gestalt of this operation, encryption data (an encryption key, encryption Ruhr) are generated from the key generating circuit 201, and the scramble of the above-mentioned coding bit stream S32 is performed by controlling the read-out address of the above-mentioned encoder buffer 203 based on this encryption data. That is, from the encoder buffer 203 concerned, the bit stream S33 by which the above-mentioned coding bit stream S32 was scrambled based on the above-mentioned encryption data is outputted. Therefore, the above-mentioned bit stream recorded on the optical disk 208 as the above-mentioned signal S34 will consist of data by which the scramble based on the above-mentioned encryption data was performed.

[0017] Moreover, the information on the encryption data (encryption Ruhr) of the key generating circuit 201 is supplied to the above-mentioned encoder buffer 203 as data with the video data (and audio data) from the above-mentioned video encoder 202. The encryption data furthermore supplied to this encoder buffer 203 are sent to a switch 210, after being sent to the above-mentioned multiplexing machine 204 and adding an error condition by the ECC encoder 205. Finally the encryption data concerned will be written in the predetermined field on an optical disk 208 (sector).

[0018] When it is made to write it in a predetermined sector as a bit stream as usual, namely, when it becomes irregular like the case of the bit stream of an audio and a video decoder (AV data) in the main modulation circuit 206 and is made to write in a predetermined sector about this encryption data here, it is got over and analyzed easily and the encryption data concerned are in the end. And the bit stream can also be decoded easily.

[0019] So, with the gestalt of this operation, it is made to become irregular by the modulation technique using the algorithm which changes a switch 210 and completely changes in the above-mentioned main modulation circuit 206 with delivery and submodulation circuits 209 concerned in the submodulation circuit 209 about the bit stream of this encryption data. That is, when the main modulation circuit 206 is the modulation of EFM+ of 8 -16 modulation, in the above-mentioned submodulation circuit 209, modulation techniques, such as EFM which is 8 -17 modulation currently used, for example for the so-called CD (compact disk), are used.

[0020] By this, the code train by which code conversion was carried out by different modulation technique the sector of the same size and in an error correction block will exist on an optical disk 208. Moreover, by the bit stream of AV data, and the bit stream of encryption data, when the breaks of WORD will also differ mutually, therefore it is going to reproduce encryption data with the usual regenerative apparatus, the effectiveness of making the regenerative apparatus malfunctioning will be acquired.

[0021] In addition, it shall not open to the public about the modulation technique of this submodulation circuit 209.

[0022] Next, the configuration of the reversion system (decoding system) in the gestalt system of this operation is explained using drawing 2 . With the gestalt of this operation, at least two demodulator circuits corresponding to the main modulation circuit 206 and the submodulation circuit 209 of a recording system exist also about a reversion system, respectively.

[0023] In drawing 2 , data are read from an optical disk 208 by the reproducing head 301 by the reversion system.

[0024] Here, if read-out is started based on a sector address, the predetermined sector on an optical disk 208 will be read first, and the bit stream of encryption data will be obtained. As for the bit stream of this encryption data, the recovery of 1-7RLL is made by the subdemodulator circuit 308.

[0025] As for the encryption data concerned to which it restored, an error correction is made by the ECC decoder 303, and the data with which this error correction was made are divided into various data and other data by the demultiplexer 304 after that.

[0026] The encryption data separated by the demultiplexer 304 are sent to the key discharge circuit 307 through a buffer 305, and are registered here. The encryption data registered into the key discharge circuit 307 concerned are used for descrambling of other data as an encryption key.

[0027] Next, as for the bit stream read from the sector of the usual AV data, the recovery of for example, EFM+ is made by the main demodulator circuit 302.

[0028] As for the bit stream of the AV data concerned to which it restored, an error correction is made by the ECC decoder 303, and the data with which this error correction was made are divided into various data and other data by the demultiplexer 304 after that. That is, the video data and audio data which are multiplexed are separated in the demultiplexer 304 at this time. The video data by which separation was carried out [ above-mentioned ] is sent to a buffer 305, and the audio data similarly separated are sent to the audio signal processor which omitted illustration.

[0029] The data sent to the above-mentioned buffer 305 are data with which the scramble based on encryption data is made in said recording system, and descrambling of the data concerned currently scrambled is performed by reading based on the encryption data registered into the key discharge circuit 307, and controlling the address by this buffer 305.

[0030] It is sent to the video decoder 306, compression is solved by the video decoder 306 concerned, and the data (video data compressed) by which descrambling was carried out [ above-mentioned ] from the above-mentioned buffer 305 are outputted as a video signal.

[0031] Here, the reason for the ability to prevent a duplicate with unjust this invention is explained.

[0032] Since only one modulation technique is specified and conventionally maintains compatibility as a modulation technique to a multiplexing bit stream, it is completely opened to the public by the modulation technique. For example, 16-bit modulation WORD [ as opposed to 8-bit input WORD in the modulation table EFM+ adopted as the above-mentioned DVD ] is defined. As for this modulation table, in consideration of the number which "1" and "0" follow, or the value (DSV) of Accumulation DC, the optimal combination is selected from the 16-bit WORD which can be taken. Therefore, as long as transposition is taken by this modulation technique, even if the bit stream on an optical disk is a code, it can be read as a certain code (character code). For this reason, if the code concerned is analyzed, the principle nature of a code will be able to be found out, consequently an unjust copy will be attained.

[0033] On the other hand, as shown in this invention, when only a certain sector was modulated by another modulation technique (for example, EFM) and it gets over in the demodulator circuit (the main demodulator circuit 302) of EFM+ as a codeword according the bit stream to the modulation technique of the main modulation circuit 206, the WORD which EFM+ does not define may be contained and a normal recovery becomes impossible. Moreover, in EFM+ and EFM, since codeword length differs by 16 bits and 17 bits, even separation of a codeword cannot be performed.

[0034] Therefore, the latter ECC decoder 303 tends to detect and tends to perform the error correction by ECC as if the sector concerned had an error. However, since there is no normal parity for correcting also about ECC, it will malfunction as a burst error. Therefore, the character string (namely, encryption data) itself currently written to the sector concerned is undetectable.

[0035] In addition, since it is time amount with short 1 sector extent as a modulation technique (submodulation technique) in the submodulation circuit 209, DSV does not pose a problem but can use any modulation techniques. Moreover, in the modulation technique existing [ many ], even if it is the same modulation technique, a codeword will occur like the modulation technique of a different thing by changing the regularity of a correspondence codeword. Therefore, it is difficult to try exchange of all the modulation technique and its codeword, and even if it has the usual technique, it is difficult [ it ] to specify a submodulation technique.

[0036] Moreover, the main modulation circuit and the submodulation circuit concerning the gestalt of this invention operation, the main demodulator circuit, and a subdemodulator circuit are other circumference circuits and really (formation of 1 chip) carried out, and it also becomes possible by enabling it not to operate independently only a submodulation circuit and a subdemodulator circuit to prevent the so-called reverse engineering.

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[Translation done.]

JAPANESE

[JP,11-238305,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

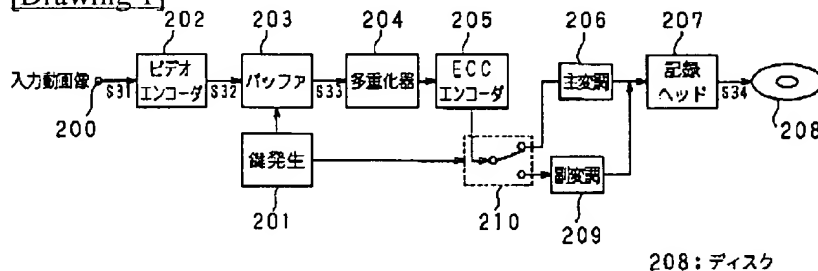
\* NOTICES \*

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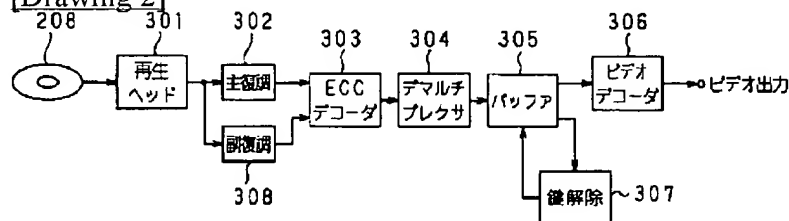
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DRAWINGS

[Drawing 1]



[Drawing 2]



[Translation done.]

JAPANESE

[JP,11-238305,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

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**DESCRIPTION OF DRAWINGS**

[Brief Description of the Drawings]

[Drawing 1] It is the block circuit diagram showing the outline configuration of the recording system (encoding system) of the system of the gestalt of this invention operation.

[Drawing 2] It is the block circuit diagram showing the reversion system (decoding system) outline configuration of the system of the gestalt of this invention operation.

[Description of Notations]

202 Video Encoder, Optical Disk, 201 Key Generating Circuit, 209 Secondary Modulation Circuit, 210 Switch, 301 Reproducing Head, 302 Main Demodulator Circuit, 303 ECC Decoder, 304 Demultiplexer, 305 Buffer, 306 Video Decoder, 307 Key Discharge Circuit, 308 Secondary Demodulator Circuit 203 Encoder Buffer 204 Multiplexing Machine 206 Main Modulation Circuit 207 Recording Head 208

[Translation done.]

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CLAIMS

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[Claim(s)]

[Claim 1] The data-processing approach which uses at least two modulation techniques, generates a codeword by modulation technique which is different from other sectors about a specific sector, and is characterized by writing in the data for decoding the data of other sectors normally into the above-mentioned specific sector.

[Claim 2] Into a codeword generation means to generate a codeword by modulation technique which uses at least two modulation techniques and is different from other sectors about a specific sector, and the above-mentioned specific sector The write-in means which writes in the data for decoding the data of other sectors normally, A record means to record the modulating signal by the above-mentioned modulation technique on a record medium, and a recovery means to restore to the data of the above-mentioned specific sector with the recovery method of one of at least two recovery methods, The data-logging regenerative apparatus characterized by having the playback means which enables normal playback of the recovery data of a sector besides the above based on the data to which the above-mentioned specific sector restored.

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[Translation done.]